keep the sutures on rubber shods and keep them straightened out by using three people in the operating room to keep them sorted and assure that they are not mangled. If you are not careful you may twist the patch or put in the eighth suture and find that it has just crisscrossed the previous seven. With an oversized patch, I would restress that we use relatively few sutures because the general higher left-sided pressures hold the patch in place. Seven or eight sutures are needed, not 15 or 20.

Dr. Spray inquired about timing of reoperation. Generally, we perform transesophageal echocardiography on all patients who have had VSD closure. The decision that a residual defect may become hemodynamically significant is somewhat arbitrary in some cases. In two of our patients transesophageal echocardiography identified previously undiagnosed anterior muscular VSDs. The defects were closed because the magnitude of the shunt was believed to be quite large because there were multiple VSDs. If we have any problem weaning the child from bypass or if the child looks unwell after being weaned, then we have to consider going back on bypass and fixing those VSDs.

Commentary

The article by Kitagawa and associates has added substantially to our database and understanding of multiple VSDs. This retrospective study of 33 patients, managed with advanced surgical techniques, demonstrates both considerable progress (mortality was only 3%) and considerable room for improvement, with "significant" morbidity in 33% and a reoperation rate of 15%.

The study also contains several important inferences that seem likely to stand the test of time. Right ventriculotomy adds little to the exposure of these VSDs: most muscular VSDs can be successfully seen and closed from an atrial approach. Infants who have midmuscular, posterior muscular, and infundibular VSDs (almost one third of this series) do well with early primary surgical repair. The authors contend that pulmonary artery banding is unwarranted in these infants, and the data support that contention.

One inference, however, deserves much more scrutiny. The authors conclude that infants with apical or anterior muscular VSDs can undergo repair early with "good long-term results." Central to this conclusion is their belief that a limited fish-mouthed left ventriculotomy, required in seven of nine infants with apical VSDs, is a benign procedure on late follow-up.

The prior history of ventriculotomy as a cardiac surgical procedure would not seem to warrant such optimism. Late complications of aneurysm formation, reduced global function, and ventricular arrhythmias have been repeatedly observed after ventriculotomy for tetralogy of Fallot, single ventricle with restrictive bulboventricular foramen, and left ventricular apical aortic conduits. Despite this experience, one cannot dismiss left ventriculotomy from the arsenal of therapies that might help in the management of this difficult disease. One should, however, recognize the experimental nature of infantile left ventriculotomy and require careful follow-up. Absence of significant problems on standard clinical follow-up is not enough. A careful program in these patients, studying left ventricular mechanical function, left ventricular electrical function, mitral valve function, and completeness of septal closure by means of sophisticated noninvasive and, when necessary, invasive studies would seem only prudent. Given the unfortunate history of ventriculotomies, the burden of proving its safety lies with those who advocate its increased use.

James E. Lock, MD
Boston, Mass.
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